

1. (As Once Amended) An isolated polypeptide selected from the group consisting of:

- a) a polypeptide comprising the amino acid sequence of SEQ ID NO:1,
- b) a polypeptide comprising a naturally occurring amino acid sequence at least 90% identical to the amino acid sequence of SEQ ID NO:1, wherein said polypeptide has CoA dehydrogenase activity,
- c) a fragment of a polypeptide having the amino acid sequence of SEQ ID NO:1, wherein said fragment has CoA dehydrogenase activity, and
- d) an immunogenic fragment of a polypeptide having the amino acid sequence of SEQ ID NO:1, wherein said fragment comprises at least 15 contiguous amino acid residues of SEQ ID NO:1.

11. (Thrice Amended) An isolated antibody selected from the group consisting of:

- a) an antibody which specifically binds to a polypeptide comprising the amino acid sequence of SEQ ID NO:1, wherein the antibody specifically binds to an epitope of a polypeptide of SEQ ID NO:1,
- b) an antibody which specifically binds to a polypeptide comprising a naturally occurring amino acid sequence at least 90% identical to the amino acid sequence of SEQ ID NO:1, wherein said polypeptide has CoA dehydrogenase activity, and wherein the antibody specifically binds to an epitope of a polypeptide at least 90% identical to SEQ ID NO:1, and
- c) an antibody which specifically binds to a polypeptide comprising an immunogenic fragment of a polypeptide consisting of the amino acid sequence of SEQ ID NO:1, wherein said fragment comprises at least 15 contiguous amino acid residues of SEQ ID NO:1, and wherein the antibody specifically binds to an epitope of the fragment.

30. A diagnostic test for a condition or disease associated with the expression of HSCD in a biological sample, the method comprising:

- a) combining the biological sample with an antibody of claim 11, under conditions suitable for the antibody to bind the polypeptide and form an antibody:polypeptide complex, and

b) detecting the complex, wherein the presence of the complex correlates with the presence of the polypeptide in the biological sample.

✓ 31. The antibody of claim 11, wherein the antibody is:

- a) a chimeric antibody,
- b) a single chain antibody,
- c) a Fab fragment,
- d) a F(ab')₂ fragment, or
- e) a humanized antibody.

✓ 32. A composition comprising an antibody of claim 11 and an acceptable excipient.

✓ 33. A method of diagnosing a condition or disease associated with the expression of HSCD in a subject, comprising administering to said subject an effective amount of the composition of claim 32.

✓ 34. A composition of claim 32, wherein the antibody is labeled.

✓ 35. A method of diagnosing a condition or disease associated with the expression of HSCD in a subject, comprising administering to said subject an effective amount of the composition of claim 34.

✓ 36. A method of preparing a polyclonal antibody with the specificity of the antibody of claim 11, the method comprising:

- a) immunizing an animal with a polypeptide consisting of the amino acid sequence of SEQ ID NO:1, or an immunogenic fragment thereof, under conditions to elicit an antibody response,
- b) isolating antibodies from said animal, and
- c) screening the isolated antibodies with the polypeptide, thereby identifying a polyclonal antibody which binds specifically to a polypeptide comprising the amino acid sequence of SEQ ID NO:1.

✓ 37. A polyclonal antibody produced by a method of claim 36.

✓ 38. A composition comprising the polyclonal antibody of claim 37 and a suitable carrier.

✓ 39. A method of making a monoclonal antibody with the specificity of the antibody of claim 11, the method comprising:

- a) immunizing an animal with a polypeptide consisting of the amino acid sequence of SEQ ID NO:1, or an immunogenic fragment thereof, under conditions to elicit an antibody response,
- b) isolating antibody producing cells from the animal,
- c) fusing the antibody producing cells with immortalized cells to form monoclonal antibody-producing hybridoma cells,
- d) culturing the hybridoma cells, and
- e) isolating from the culture monoclonal antibody which binds specifically to a polypeptide comprising the amino acid sequence of SEQ ID NO:1.

✓ 40. A monoclonal antibody produced by a method of claim 39.

✓ 41. A composition comprising the monoclonal antibody of claim 40 and a suitable carrier.

✓ 42. The antibody of claim 11, wherein the antibody is produced by screening a Fab expression library.

✓ 43. The antibody of claim 11, wherein the antibody is produced by screening a recombinant immunoglobulin library.

✓ 44. A method of detecting a polypeptide comprising the amino acid sequence of SEQ ID NO:1 in a sample, the method comprising:

a) incubating the antibody of claim 11 with a sample under conditions to allow specific binding of the antibody and the polypeptide, and

b) detecting specific binding, wherein specific binding indicates the presence of a polypeptide comprising the amino acid sequence of SEQ ID NO:1 in the sample.

58. A method of purifying a polypeptide comprising the amino acid sequence of SEQ ID NO:1 from a sample, the method comprising:

a) incubating the antibody of claim 11 with a sample under conditions to allow specific binding of the antibody and the polypeptide, and

b) separating the antibody from the sample and obtaining the purified polypeptide comprising the amino acid sequence of SEQ ID NO:1.

56. A polypeptide of claim 1, comprising the amino acid sequence of SEQ ID NO:1.

58. An isolated antibody which specifically binds to a polypeptide selected from the group consisting of:

a) a polypeptide consisting of the amino acid sequence of SEQ ID NO:1, and

b) an immunogenic fragment of a polypeptide consisting of the amino acid sequence of SEQ ID NO:1, wherein said fragment comprises at least 15 contiguous amino acid residues of SEQ ID NO:1.